Towards energy-efficient offshore platforms

Nguyen, Tuong-Van; Pierobon, Leonardo; Elmegaard, Brian

Publication date:
2012

Document Version
Publisher's PDF, also known as Version of record

DTU Mechanical Engineering
Department of Mechanical Engineering

Towards energy-efficient offshore platforms

Tuong-Van Nguyen[1,*], Leonardo Pierobon[1], Brian Elmegaard[1]

[1] Technical University of Denmark, Department of Mechanical Engineering, Section of Thermal Energy
[*] Corresponding author, Email: tungu@mek.dtu.dk

1 Motivation

- North Sea **oil and gas platforms** responsible for ***26%*** of the total **CO_2 emissions** of Norway (2011)
- They have a **substantial power consumption**: ***10 to 100 MW***
- The aim of these offshore facilities is to **separate** ***oil***, **gas** and **water** for further refining onshore
- Onsite processes become ***less efficient*** with time: the contents of **water** and **gas** fluctuate **and** off-design conditions take place

Figure 1: Picture of the Draugen oil and gas offshore platform (Kristiansund, Norway)

2 Methodology

- Process modelling of the current offshore platforms
- Energy and exergy analysis of the processing and utility systems
- Design of future oil and gas facilities remaining efficient over time

3 Results and discussion

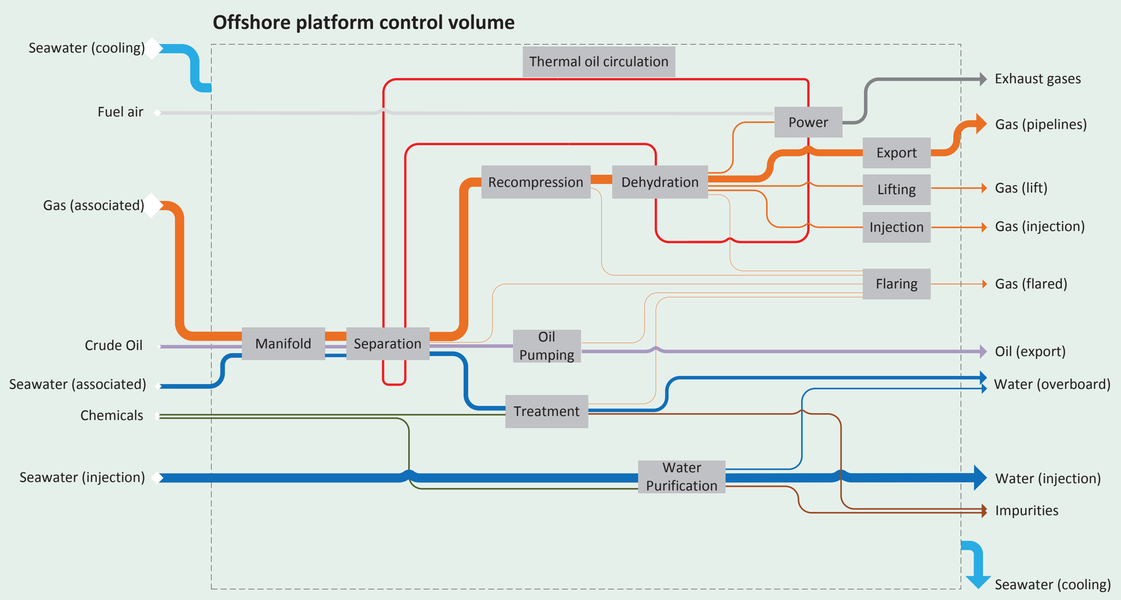

Figure 2: Process model of the offshore platform system

The largest ***performance improvement*** opportunities lie in a more efficient use of:

1. Combustion chambers of the gas turbines
2. Exhaust gases from the waste heat recovery system
3. Flared gases from the processing plant
4. Production manifold
5. Compressors in the gas compression train

4 Acknowledgements

Funding from the Norwegian Research Council through Petromaks led by Teknova with project n°203404/E30 is acknowledged.

DTU Mechanical Engineering
Department of Mechanical Engineering
DTU Mechanical Engineering
Department of Mechanical Engineering
DTU Mechanical Engineering
Department of Mechanical Engineering
DTU Mechanical Engineering
Department of Mechanical Engineering